**Unilateral Vestibular Hypofunction Toolbox**

Individuals who present with UVH need to be thoroughly assessed by the physical therapist. Listed below are the assessment tools and outcome measures that may be used during rehabilitation for an individual who presents with unilateral vestibular hypofunction.

*Impairment-Level:*

1. Dynamic Visual Acuity (DVA)- Dynamic Visual Acuity measures visual acuity with horizontal motion of the head. The test is performed with passive horizontal head motion at speed greater than 100 degrees per second. The patient is first asked to read the lowest line they can see on a Snellen chart while their head is stationary. Then the therapist passively moves the patient’s head from side to side at a frequency of 2 Hz and the patient reads the lowest line they can. A greater than 3 line difference suggests vestibular hypofunction, including unilateral vestibular hypofunction.1,2 http://www. resourcesonbalance.com/neurocom/protocols/vorimpairment/dva.aspx
2. Head Thrust test- the Head Thrust or Head Impulse Test assesses semicircular canal function. To perform this test, the therapist should manually rotate the patient’s head at a small amplitude and high velocity while the patient tries to keep his or her eyes on the therapist’s nose. A positive test is when there is a corrective saccade made to reposition the eyes when the therapist rotates the head toward to side with the hypofunction. To test the horizontal canals, the head should be flexed 30o. Amplitude should be 5 to 15 degrees and velocity 3000 to 4000o/sec2. Cervical ROM and dysfunction should be determined prior to performing this test.1,3 After treatment, the test should be negative. [http://www.gpnotebook.co.uk/ simplepage.cfm?ID=x20100826145420802671](http://www.gpnotebook.co.uk/%20simplepage.cfm?ID=x20100826145420802671)
3. Head-shaking Induced Nystagmus (HSN)- this test helps to identify UVH specifically. To perform this test, patients should close their eyes. The therapist should flex the patient’s head 30o and then manually rotate the head side to side 20 times at a speed of 2 repetitions per second. After the rotation is complete, the patient should open his or her eyes and a positive test is identified when nystagmus is present. This test is not very sensitive because patients may have a negative HSN but still have unilateral vestibular hypofunction.1 After vestibular rehabilitation, the test should be negative.

[http://www.dizziness-and-balance.com/research/hsn/Head%20 Shaking%20Nystagmus.htm](http://www.dizziness-and-balance.com/research/hsn/Head%20%20%09Shaking%20Nystagmus.htm)

1. Visual Analog Scale (VAS)- the VAS can be used as a subjective rating scale of many different subjective complaints, most commonly pain. However, it can effectively measure dizziness or vertigo. Patients are asked to record on a 10cm line how severe their symptoms are at that specific point in time. A score of 0 means there are no symptoms and a score of 10 means symptoms are extremely severe.1,2,5 The MCID for the VAS is between 2.1 and 5.7cm.

<http://www.ncbi.nlm.nih.gov/pubmed/21846956>

*Activity Level:*

1. Dynamic Gait Index (DGI)- The Dynamic Gait Index assesses falls risk and can be effective to assess falls risk in individuals with vestibular dysfunction. The assessment contains 8 separate walking tasks including walking while changing speed and walking while turning the head. A score of less than 19 suggests a high fall risk.2,3,5 MDC for peripheral vestibular disorders is 3.2. <http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx>
2. Five Times Sit to Stand- To perform this test, a patient sits with arms folded across chest and back against the chair, and the patient stands up and sits down five times as quickly as they can. The MCID for individuals with vestibular disorders is 2.3 seconds or more.5 http://www. rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=1015&Source

*Participation:*

1. Dizziness Handicap Index (DHI)- The DHI is a validated 25-item questionnaire that quantitatively measures how an individual believes his or her dizziness affects function and impact on daily activities. This assessment has excellent psychometrics, and the components of the questionnaire include functional, emotional, and physical subcategories. It can be used to measure a subjective improvement in patient symptoms.1,5,6 MCID is 18 points for both peripheral and central vestibular disorders. http:// www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=1041
2. Activities-Specific Balance Confidence Scale (ABC)- this is a 16-item subjective questionnaire that asks patients to rate their confidence performing different activities that require balance. The scale goes from 0 to 100, with 0 meaning zero confidence and 100 meaning very confident. It has good psychometric properties for people with vestibular disorders.1,5 The MDC or MDIC haven’t been determined for vestibular disorders, but the MDC is between 11 and 13 for Parkinson’s disease. http://www.rehabmeasures. org/Lists/RehabMeasures/DispForm.aspx?ID949
3. Functional Disability Scale- this scale was developed to objectively assess a patient’s response to physical therapy. Patients who believe their vestibular dysfunction is extremely disabling have poorer responses to physical therapy than individuals who report less disabling effects of their vestibular dysfunction.1 Zero means no disability and five means severe disability.1,5,8 No MDC or MDIC have been established for peripheral vestibular disorders.

<http://171.67.121.218/content/118/1/49.abstract>

1. Motion Sensitivity Quotient- this assessment measures an individual’s subjective report of their dizziness. To perform this test, patients are placed into different positions that often provoke vestibular symptoms, including sitting to supine, Hallpike-Dix position, and sitting head rotation five times. After each position, a patient determines whether the movement provokes dizziness. Symptom intensity is recorded from 1 to 5 and duration 0 to 3. A score of 100 means severe dizziness in all positions.1,5,7 31-100% means severe dizziness. No MCD or MCID have been established.

<http://www.asha.org/aud/articles/vestibularrehab/>

The following are additional assessment tools that can be considered in the assessment of UVH:

1. Sensory Organization Test (SOT)- this test identifies abnormalities by having patients balance during controlled visual, vestibular, and somatosensory situations.9 <http://www.resourcesonbalance.com/neurocom/protocols/sensoryImpairment/SOT.aspx>
2. Single Legged Stance- this is a simple, easy, and effective way to screen for balance impairments. Research suggests a significant, moderate correlation between single leg stance time and peripheral vestibular disease.1,10

<http://www.ncbi.nlm.nih.gov/pubmed/9004971>

1. Romberg- this test examines balance by removing visual input, which allows for vestibular impairments to be more easily identified. A test is positive when a patient has excess sway during the 30 second test.1,2,5 <http://www.neuroexam.com/neuroexam/content.php?p=37>
2. Tinetti Fall Risk Performance Scale- this 16-item scale measures an older adult’s gait and balance abilities to determine if a patient is at a risk of falling. It can assess vestibular impairments that contribute to balance deficits.5

[http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID= 1039](http://www.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=%091039)

1. Hospital Anxiety and Depression Scale (HADS)- this scale is a 14-item self-assessment that aims to capture psychological effects of anxiety and depression on individuals with vestibular dysfunction.11

<http://www.ncbi.nlm.nih.gov/pubmed/6880820>

**References**:

1. Schubert MC. Vestibular Disorders in: O’Sullivan SJ and Schmitz TJ. Physical Rehabilitation. F.A. Davis: Philadelphia. 2004.

2. Hall CD, Schubert MC, Herdman SJ. Prediction of fall risk reduction as measured by dynamic gait index in individuals with unilateral vestibular hypofunction. *Otology and Neurotology* 2004; 25: 746-751.

3. Hain T. Vestibular Neuritis and Labyrinthitis. Dizziness-and-balance.com. 2009. Accessed on March 7, 2013 from <http://www.dizziness-and-balance.com/disorders/unilat/vneurit.html>

4. Schubert MC, Minor LB. Vestibulo-ocular physiology underlying vestibular hypofunction. *Phys Ther* 2004; 84(4): 373-385.

5. Rehabilitation Institute of Chicago. Rehabilitation Measures Database: the rehabilitation clinician’s place to find the best instruments to screen patients and monitor their progress. Accessed on March 8, 2013 from [www.rehabmeasures.org/](http://www.rehabmeasures.org/)

6. Chen P, Hsieh W, Wei S, Kao C. Interactive wiimote gaze stabilization exercise training system for patients with vestibular hypofunction. Journal of NeuroEngineering and Rehabilitation 2012; 9:77.

7. Marigold, D. S., Eng, J. J., Dawson, M. D., Ingles, J. T., Harris, J. E., & Gylfadottir, S. Exercise leads to faster postural reflexes, improved balance and mobility and fewer falls in older persons with chronic stroke. Journal of the American Geriatrics Society, 2005; 53:416-423.

8. Cowand JL, Wrisley DM, Walker M, Strasnick B, Jacobson JT. Efficacy of vestibular rehabilitation. *Otolaryngology-Head and Neck Surgery* 1998; 118(1): 49-54.

9. Pedalini ME, Cruz OL, Bittar RS, Lorenzi MC, Grasel SS. Sensory organization test in elderly patients with and without vestibular dysfunction. *Acta Otolaryngol* 2009; 129(9): 962-5.

10. Mann GC, Whitney SL, Redfern MS, Borell-France DF, Fruman JM. Functional reach and single leg stance in patients with peripheral vestibular disorders. *J Vestib Res* 1996; 6(5): 343-53.

11. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; 67(6): 361-70.